

WHAT IS CLAIMED IS:

1. An optical recording medium comprising:  
a recording layer, in which information is recorded in a  
5 three-dimensional manner in an in-plane direction and a thickness  
direction of the recording layer;  
wherein the recording layer comprises a thermochromic material  
whose color changes reversibly according to a temperature, and  
the thermochromic material converts absorbed light into heat and  
10 increases its light absorptance as the temperature rises.
2. The optical recording medium according to claim 1, wherein the  
thermochromic material changes irreversibly to a translucent substance  
whose color does not change according to a temperature change, when the  
15 temperature reaches a first predetermined temperature or higher.
3. The optical recording medium according to claim 1, wherein the  
thermochromic material has a light absorptance that is constant at a  
temperature lower than a second predetermined temperature and increases  
20 as the temperature rises at the second predetermined temperature or  
higher.
4. The optical recording medium according to claim 1, wherein the  
recording layer is divided into a plurality of recording sublayers by a  
25 separating film formed of a translucent material.
5. The optical recording medium according to claim 4, wherein a  
refractive index of the translucent material is different from that of the  
thermochromic material.
- 30 6. The optical recording medium according to claim 1, wherein the  
recording layer has unevenness on its surface.
7. The optical recording medium according to claim 1, wherein a  
35 reflecting film is provided on a surface opposite to a light incident side of the  
recording layer.

8. An optical information processing apparatus comprising:  
an optical recording medium comprising  
a recording layer comprising a thermochromic material  
5 whose color changes reversibly according to a temperature,  
wherein the thermochromic material has a property of  
converting absorbed light into heat and increasing its light absorptance as  
the temperature rises, and  
information is recorded in a three-dimensional manner in an  
10 in-plane direction and a thickness direction of the recording layer;  
a radiation light source;  
a focusing optical system for focusing light emitted from the  
radiation light source onto a minute spot on the optical recording medium;  
and  
15 a photodetector for receiving the light transmitted or reflected by the  
optical recording medium and outputting a reproducing signal.

9. The optical information processing apparatus according to claim 8,  
wherein the thermochromic material changes irreversibly to a translucent  
20 substance whose color does not change according to a temperature change,  
when the temperature reaches a first predetermined temperature or higher.

10. The optical information processing apparatus according to claim 8,  
wherein the thermochromic material has a light absorptance that is  
25 constant at a temperature lower than a second predetermined temperature  
and increases as the temperature rises at the second predetermined  
temperature or higher.

11. The optical information processing apparatus according to claim 8,  
30 further comprising a control portion for controlling an intensity of the light  
emitted from the radiation light source so that an amplitude of the  
reproducing signal is at a maximum.

12. The optical information processing apparatus according to claim 8,  
35 further comprising a control portion for detecting a high-frequency signal  
component, which is a signal component whose frequency is high, in the  
reproducing signal and controlling an intensity of the light emitted from the

radiation light source so that an amplitude of the high-frequency signal component is at a maximum.

13. The optical information processing apparatus according to claim 8,

5 further comprising a control portion for controlling an intensity of the light emitted from the radiation light source so that a region of the recording layer whose color is changed by irradiation of the light emitted from the radiation light source is smaller than the minute spot.

10 14. The optical information processing apparatus according to claim 8,

wherein the recording layer is divided into a plurality of recording sublayers by a separating film formed of a translucent material.

15 15. The optical information processing apparatus according to claim 14,

wherein a refractive index of the translucent material is different from that of the thermochromic material.

16. The optical information processing apparatus according to claim 8,

wherein a position where the minute spot is formed in the recording layer is detected by the light reflected by a surface of the recording layer.

20 17. The optical information processing apparatus according to claim 8,

wherein unevenness is provided on a surface of the recording layer, and a position where the minute spot is formed is detected based on a position of the unevenness.

18. An optical recording and reproducing method, the method for

performing recording and reproducing with respect to an optical recording medium comprising

30 a recording layer comprising a thermochromic material whose color changes reversibly according to a temperature,

wherein the thermochromic material has a property of converting absorbed light into heat and increasing its light absorptance as the temperature rises, and

35 information is recorded in a three-dimensional manner in an in-plane direction and a thickness direction of the recording layer;

wherein the information is recorded in and reproduced from the

recording layer by irradiating converged light at a predetermined position in the recording layer and raising a temperature of the predetermined position.

19. The optical recording and reproducing method according to claim 18,

5 wherein the thermochromic material changes irreversibly to a translucent substance whose color does not change according to a temperature change, when the temperature reaches a first predetermined temperature or higher.

20. The optical recording and reproducing method according to claim 18,

10 wherein the thermochromic material has a light absorptance that is constant at a temperature lower than a second predetermined temperature and increases as the temperature rises at the second predetermined temperature or higher.

15 21. The optical recording and reproducing method according to claim 18,

wherein the information is reproduced from the recording layer by detecting a light transmittance or a light reflectance at the predetermined position in the recording layer.

20 22. The optical recording and reproducing method according to claim 18,

wherein the information is recorded in the recording layer by irradiating the converged light at the predetermined position in the recording layer and raising the temperature of the predetermined position to the first predetermined temperature or higher.

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23. The optical recording and reproducing method according to claim 18,

wherein an intensity of the converged light is controlled so that an amplitude of an obtained reproducing signal is at a maximum.

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24. The optical recording and reproducing method according to claim 18,

wherein an intensity of the converged light is controlled so that a region of the recording layer whose color is changed by irradiation of the converged light is smaller than a focusing spot of the converged light.

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25. The optical recording and reproducing method according to claim 18,

wherein the recording layer is divided into a plurality of recording sublayers by a separating film formed of a translucent material.

26. The optical recording and reproducing method according to claim 25, wherein a refractive index of the translucent material is different from that of the thermochromic material.

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27. The optical recording and reproducing method according to claim 18, wherein a position where a focusing spot of the converged light is formed in the recording layer is detected by light reflected by a surface of the recording layer.

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28. The optical recording and reproducing method according to claim 18, wherein unevenness is provided on a surface of the recording layer, and a position where a focusing spot of the converged light is formed is detected based on a position of the unevenness.

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